ZOOLOGY.—*The cutaneous muscles of the Adelie penguin* (Pygosceles adeliae). L. R. SETTY, School of Medicine, Howard University. (Communicated by Herbert Friedmann.)

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The material used in this account of the cutaneous muscles of the Adelie penguin (*Pygosceles adeliae*) was taken from one specimen that died in the zoo at Portland, Oreg. The cutaneous musculature of one specimen of the emperor penguin (*Aptenodytes fosteri*) from the same zoo was also examined.

The cutaneous muscles remained attached to the underside of the removed skin. Because of this fact, the muscles were studied and figured from their medial surfaces (Fig. 1). They were observed both when they were in the fresh state and later when they were preserved in a solution made of equal parts of 4-percent formaldehyde, glycerine, and 95-percent alcohol.

The only description to be found in the literature available, on cutaneous muscles of penguins was that in *Report on the anatomy of the Spheniscidae* by Dr. Morrison Watson (Zool. Voy. *Challenger*, pt.

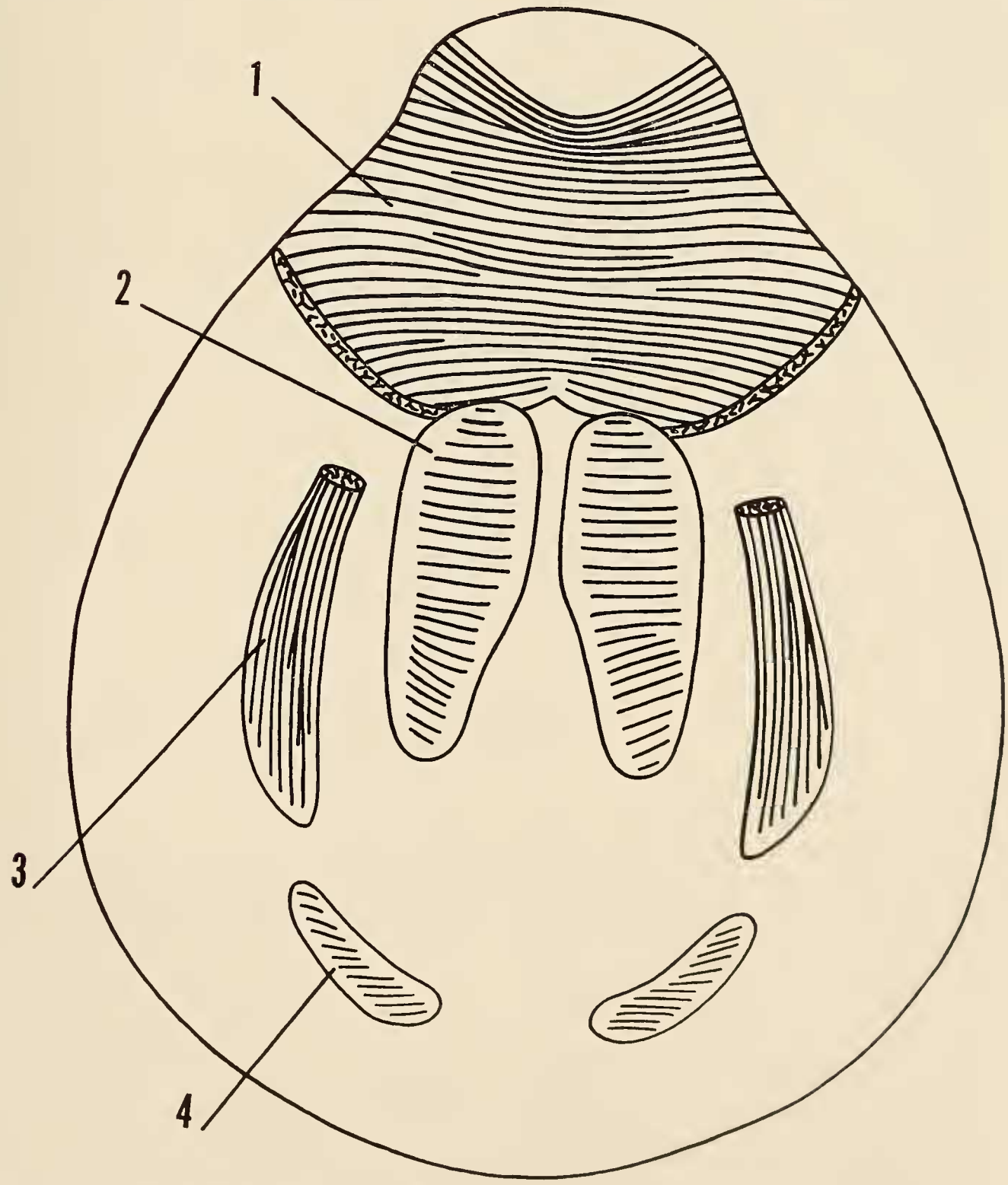

FIG. 1.—The cutaneous muscles of the Adelie penguin (*Pygoceles adeliae*). These muscles are shown from their underside and *in situ* in the removed skin. 1, Panniculus carnosus; 2, cutaneous dorsalis; 3, abdominis superior; 4, abdominis inferior.

18. 1883). Watson described and figured the cutaneous muscles for *Eudyptes chrysome*, and he observed these muscles in *Eudyptes chrysolophus*, *Aptenodytes longirostris*, *Spheniscus magellanicus*, *Spheniscus minor*, and *Pygosceles taeniatus*. He stated that the system of cutaneous muscles is developed to a greater extent in penguins than in any other bird, with the exception of *Apteryx*. He added that this development is probably related to their aquatic habits and the necessity of an arrangement whereby the water may be readily expelled from the interstices of their furlike plumage.

The cutaneous muscles of *Pygosceles adeliae* (Fig. 1) are as follows:

1. *Panniculus carnosus*: A very extensive muscle extending over the whole cervical region. Its origin is from the upper border of the clavicle. Many of its fibers are inserted on the cranium just back of the orbit, and many of its fibers extend to the middorsal line of the neck, where they blend with the corresponding fibers of the opposite side.

2. *Cutaneus dorsalis*: An elongated muscle on the dorsal side of the cephalic end of the trunk. Most of the fibers run transversely to its long axis. Its cephalic half is wider than its caudal half. In *Aptenodytes fosteri* the two halves of cutaneus dorsalis are essentially of the same width.

Watson stated that in the two specimens of *Pygosceles taeniatus* he dissected this muscle was entirely wanting. But this muscle is quite conspicuous in *Pygosceles adeliae*.

3. *Abdominis superior:* An elongated muscle on the lateral side of the trunk. Its fibers run approximately parallel to the long axis of the body. At its cephalic end it attaches to the tendon of insertion of pectoralis major.

4. *Abdominis inferior:* An elongated muscle but only about half as long as abdominis superior. It is situated caudad of abdominis superior. Most of its fibers run obliquely.

In *Pygosceles adeliae* a distance of about 1 inch intervenes between abdominis inferior and abdominis superior. But in *Aptenodytes fosteri* the cephalic end of abdominis inferior makes contact with the caudal end of abdominis superior.

The names abdominis superior and abdominis inferior are here used for the first time in the nomenclature of cutaneous muscles of penguins. Watson considered (for the species studied by him) the muscles here so named as parts of a muscle termed muscle des parures.

A fifth cutaneous muscle, called constrictor colli, has been described by Watson. But its fibers are very intimately blended with those of panniculus carnosus. Therefore it is here considered as a part of panniculus carnosus.

By Nature's kindly disposition most questions which it is beyond a man's power to answer do not occur to him at all.—GEORGE SANTAYANA.